

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

APR 08 1991

DATE:

SUBJECT: Review of the RI Report Baseline Risk Assessment for the
American Chemical Services NPL Site, Griffith, IN

FROM: Pat Van Leeuwen, Toxicologist *P. Van Leeuwen*
Technical Support Unit

TO: Robert E. Swale, RPM

I have reviewed the Draft Report of the Baseline Risk Assessment for the ACS Superfund site. Although this is a very difficult site, having been found to contain nearly all of the 150 chemicals on the RAS and TAL screening lists as well as nearly 400 tentatively identified compounds (TICs), the bulk of the data on these contaminants was well organized and presented in a comprehensible manner. The presentation of the exposure pathways was more than complete (a few pathways such as the incidental ingestion of surface water need not have been included) and in general, the choice of exposure parameter values was totally acceptable. However, I have noted a number of areas of concern - especially in the calculation of the exposure point concentration and in the final risk/hazard calculation step - where specific guidance provided to the contractors was completely ignored. The latter has resulted in some totally erroneous conclusions concerning the health hazards at this site. The following comments pinpoint the major areas of concern in the Baseline Risk Assessment.

If you or the contractors have any questions about these comments or need further guidance on any parts of the risk assessment, please feel free to call me at 886-4904. I have also enclosed a disk copy of these comments and a critique sheet to allow the TSU to evaluate this service.

1) Page 14, section 7.1.3.5.1.1 The discussion presented here is completely misleading. The Baseline Risk Assessment assumes the "no action" alternative - that is, the risks to human health which may occur at any time in the future if U.S.EPA does not require some remediation of the site. The basis of the risk assessment, is the current land use (not the most current monitoring results which in some instances may be

several years old). The **current land use** takes into account that given the present use of residential wells as a drinking water source, ingestion of contaminants in the lower aquifer may occur at any time....next month, next year, in ten years, or may have already occurred since the last sampling data was collected. Likewise, the **current land use** takes into account that there are residents and workers employed in the area who have access now and will have access in the future to contaminated areas of the site. This access may actually increase in future years, as it cannot be assumed that ACS will own the site in the future or that land access will be restricted. The **future land use** scenario presents the more conservative approach, as it assumes that the land may become inhabited at some time in the future, even if only by a few residents in mobile homes with private wells. The paragraph should be rewritten, incorporating this discussion.

2) Page 16, section 7.1.3.5.1.1.2, 2nd para. The confining clay layer between the upper and lower aquifers is reported to be only 2.5 ft deep in some areas of the site; this weakens the plausibility of the argument for substantial retardation of contaminant migration downward due to this confining layer. In addition, contaminant concentrations are already elevated in the lower aquifer, suggesting that future exposure is likely given the **current land use**. Discuss these apparent discrepancies here.

3) Page 16, section 7.1.3.5.1.1.2 VOCs in subsurface soil are not usually considered to be an air threat unless the subsurface soil is exposed - as in a future land use. Only VOCs in surface soil need be considered in the current land use scenario, especially given the that the surface soil layer is defined as the top 3 feet.

4) Page 18, last para. The Baseline Risk Assessment addresses potential **current land use** exposures, not current observations. Correct this discussion.

5) Page 21, section 7.1.3.5.2.1.1 Would anyone really sink a drinking water in the upper aquifer if it is not classified for potable use? This seems very unlikely.

6) Page 26, section 7.1.3.6.1.2 RAGS (U.S.EPA, 1989) allows the use of the permeability constant (PC) of water to derive default values when chemical-specific values are not available. The document gives the outdated (1984) PC of water as 8.4×10^{-4} cm/hr. You were provided with specific instructions that the PC of water should only be used for metals and inorganics and with guidance from ECAO. The latter allows for the updated PC of water (1.5×10^{-3} cm/hr) to be used for inorganics and the updated PC for toluene 1.01 cm/hr) to be used as a default value for volatile organics when toluene is present. The PC for 2-butanone can be used for semivolatile organics when this compound is present. The use of the PC for

water is never appropriate for these organic compounds. These values will have to be changed in Table 7-17 and in the calculations. The use of the correct PCs in this risk assessment will significantly change the conclusion section.

7) Page 27, section 7.1.3.6.1.3 The approach taken here for the estimation of the inhalation exposure to VOCs released from drinking water is not very quantitative. The approach presented as Exhibit 6-16 in RAGS, page 6-44, is better and should be used for this exposure pathway.

8) Page 28, section 7.1.3.7 The use of the term "mean" implies that the arithmetic mean, as suggested in RAGS, was used. This is not the case as the statistic used in this risk assessment was a modified geometric mean. This requires some explanation as to why the arithmetic mean was not used. See also the comments on Appendix U, page 3.

9) Page 29, section 7.1.3.7.1 The use of the UCLM value for contaminants in groundwater is not appropriate. Residents are exposed to a single contaminant concentration, not an average of the entire aquifer. See also comments for Appendix U, page 1.

10) Page 36, section 7.1.5.3.1, para. 2 As noted previously, this discussion is totally incorrect. Health risks in the Baseline Risk Assessment are based on current land use not "current monitoring conditions". Correct this discussion, incorporating the comments in response #1 above.

11) Page 36, last sentence Please add that the MCL value for arsenic assumes that drinking water is the only route of exposure to arsenic and that arsenic is the only chemical of concern. Because the "single chemical, single source" rationale does not apply at most Superfund sites, comparison with the MCL is not very relevant.

12) Page 37, 1st para. Why are the risks to the upper and lower aquifers only considered nonconcurrently? Can you be certain that children who use swimming pools filled with water from the upper aquifer never drink water from the lower aquifer? Please explain the rationale used here. Also, don't these children also breathe the same air as the resident adults? Don't trespassing children also have offsite exposures? These subpopulations of children are likely to have exposure to the same chemicals from several pathways, and these exposures should be summed to allow assess of the total risk to the MEI (Maximally Exposed Individuals or Populations). Therefore, exposures should always be considered from the target population viewpoint as well as the medium viewpoint. The number of subpopulations addressed in the risk assessment can be reduced to the most sensitive groups; the 30 year (adult exposure) should assume exposure as a child plus exposure for the remaining years as an adult if reasonable. This approach also applies to the future scenario.

13) Page 37, para. 2 This is a totally erroneous conclusion. The risk is not due to 2-butanone. The PC for water is never appropriate for organic chemicals; this error has lead to the naive conclusions presented here. Refer also to comment #6 above. The entire summary section (7.1.5.3.1) will have to be rewritten to reflect the conclusion from the corrected calculations.

14) Section 7.1.5.3.1 (Summaries) The discussions addressing the noncarcinogenic risks as expressed by the individual hazard quotients (HQs) or additive Hazard Indices (HIs) is incorrect. A HQ >1.0 for a specific contaminant indicates a likelihood of the adverse health effect due to exposure to that chemical. When the HQs for several contaminants give an additive HI > 1.0, the HQs must be regrouped according to target organ effect or mechanism of action. If the HI for all chemicals having the same target organ effect is > 1.0, there is a likelihood of the effect. All pathways should be considered in the summation. Review "Segregation of Hazard Indices", page 8-14, RAGS, for additional guidance on this point.

15) Last bullet, other major assumptions Assuming "no corrective action/no restrictions/no development" does not tend to elevate (overestimate) the Site risks; rather it is the basis of the risk calculation. Obviously, if the site had been remediated, we would not need to do a Baseline Risk Assessment to evaluate risks from current or future land use. This bullet is misleading.

16) Table 7-1 This table is rather useless unless the contaminant names are cross-referenced to the ACS # in another table. Wouldn't it be more helpful to the reader to list the chemicals directly by name?

17) Tables 7-2 through 7-10 Notes at the end of these tables indicate that results of metal analysis are reported to three significant digits, while organic analysis results are accurate to two significant digits. Reporting chemicals concentrations in up to 9 significant digits implies an accuracy which is not possible. Correct all reported values to either two or three significant digits as appropriate.

Also, what is meant by the "mean" in these tables? An arithmetic mean should be reported; one-half of the Sample Quantitation Limit (SQL) should be used for zero values. A "mean" of 4.00, given 2/24 detects at concentrations of 1.00 and 7.00 is impossible, and implies that such an erroneous value was used in the risk calculations. Please correct these tables to show the actual mean concentration values used in the calculations.

18) Table 7-17 The use of NA (not available) for RfDs and SFs which are not available will make this table easier to read.

Many of the toxicity values listed differ from those in IRIS and HEAST. Recheck your toxicity values and list the reference for each value to allow verification.

Correct the Permeability Constants.

The slope factor units are usually given as $(\text{mg/kg-d})^{-1}$. Change on page 35 also.

19) Table 7-38 Resumm risks to identified sensitive target populations (MEIs), including all reasonable pathways. For further guidance, see section 8.3.1, page 8-15, RAGS.

20) Appendix S, page 2, line 2 Surface soil is usually considered to consist of the top 6 inches, not the top 3 feet. Explain this deviation. Does this apply to all soil samples or only those from the Kapica-Pazmey area? Also explain in Appendix U, page 1.

21) Table S-1 Do not generate accuracy though computation. Concentration values should be reported to 2 or 3 significant digits as appropriate.

22) Appendix U, page 1 Region V does not believe that it is reasonable to assume that anyone is exposed to an "average" groundwater contaminant concentration, as residents do not use water from multiple wells. The concentration values (or values) which represent the center of the plume concentration should be used in the risk assessment; usually these are the highest concentration values detected in this medium. The use of the highest concentration values should not be considered to be a worst case calculation, as groundwater sampling locations at Superfund sites are usually chosen to determine the extent of the contaminant plume, rather than to assess the plume concentrations. In Tables U-1 through U-4, the maximum detection concentration should generally be used as the exposure point concentration, unless a different concentration can be justified.

23) Appendix U, page 3, 1.4 "For each operable unit" should read "for each media of interest".

24) Appendix U, page 3, Exposure Point Calculation In 2.2, clarify that the arithmetic mean of the transformed data set is actually the geometric mean, and that a "modified geometric mean was used to estimate the true mean" in step 2.7. In general, a) data rarely adheres to a strictly lognormal distribution; b) for descriptive statistics, the distribution is usually irrelevant; and c) the use of the modified geometric mean is usually only preferred when the coefficient of variation (COV) is >1.2 . To justify the use of the statistic given in 2.7, it is necessary to include a calculation of the COV and to verify that the distribution is lognormal. The calculated estimate of the true mean presented here is biased if the distribution is

not lognormal, so it is important to test the data before applying this formula. It is also incorrect to refer to this mean as the arithmetic mean in the text; the true nature of the statistic should be specified in the text, so that the reader is not mislead. In general, the use of the arithmetic mean will save a multitude of calculation and will give nearly the same result as the modified geometric mean.

25) It is preferable to include site descriptions, figures and maps in the Baseline Risk Assessment as this document is often used as a stand alone. The reader may not have access to the previous section.

26) The numbering system used in this document demands a comment. Usually 5 subset numbers (i.e., 1.1.1.1.1) is considered to be the maximum for comprehension. The use of a numbering system which allows an 8 number sequence serves to confuse, rather than aid, the reader. It is not possible to keep an 8 level organizational structure mind.

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